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Actions of Carbon Monoxide and Tobacco Smoke on Retinal Metabolism and Function.

The objective is to study the effects of carbon monoxide (CO), nicotine and tobacco smoke on retinal function and metabolism as determined by effects of CO on the dark-adapted electroretinogram (ERG) of the chloralose-anesthetized cat, on an isolated rabbit retina-optic nerve preparation, and on various incubated in vitro preparations of rabbit retina or bovine pigment epithelial cell suspensions. These latter are designed to determine primarily whether CO can affect the ability of the retinal pigment epithelium to convert retinol to retinaldehyde. The effects of CO on other general metabolic functions, e.g., glucose uptake and lactate production are also being studied in the incubated rabbit retina.

Present data indicates that CO causes a significant decrement in b-wave amplitude of the ERG at blood carboxyhemoglobin levels in the "smoking range," i.e., less than 10%. Studies with tobacco smoke, nicotine and nicotine-CO combinations on the ERG of the anesthetized cat reveal that nicotine has relatively little effect on the ERG and that the CO complement in tobacco smoke plays a significant role in the effects of tobacco smoke on the ERG of the anesthetized cat. There does not appear to be a significant interaction between the effects of nicotine and CO. The data could have some significance in elucidating the etiology of "tobacco amblyopia."

Activation Date: July 1, 1976

Current Grant Level: \$24,815.

1005075558

G-10A